

**REMARKS**

Claims 1-18 are pending. No new matter has been added by way of the present submission. For instance, claims 1, 4 and 7 have been amended to remove reference to the two-layered structure  $\text{In}_x\text{Ga}_{1-x}\text{N}/\text{GaN}$  where  $0 < x \leq 1$ . Claims 8, 12 and 14 have been placed into independent format. Lastly, newly added claims 16, 17 and 18 are supported by claims 1, 4 and 7, respectively, as previously pending, with the additional limitation that the GaN-based buffer layer has a thickness of 50-800 Å as supported by page 4, lines 18-21 of the present specification. Accordingly, no new matter has been added.

In view of the following remarks, Applicant respectfully requests that the Examiner withdraw all rejections and allow the currently pending claims.

**Issues under 35 U.S.C. § 103(a)**

The Examiner has rejected claims 1 and 7 under 35 U.S.C. § 103(a) as being obvious over Nagahama et al., USP 6,172,382 (hereinafter referred to a Nagahama '382) in view of Shakuda, US 2002/0125492 (hereinafter referred to as Shakuda '492). Applicant respectfully traverses this rejection.

Applicant points out that the GaN-based buffer layer of claims 1 and 7 is either a three-layered structure  $\text{Al}_y\text{In}_x\text{Ga}_{1-(x+y)}\text{N}/\text{In}_x\text{Ga}_{1-x}\text{N}/\text{GaN}$  where  $0 < x \leq 1$  and  $0 \leq y \leq 1$ , or, a superlattice structure of  $\text{In}_x\text{Ga}_{1-x}\text{N}/\text{GaN}$  where  $0 < x \leq 1$ .

Applicant submits that the Examiner has improperly selected specific elements from either Nagahama '382 or Shakuda '492 while ignoring others. For instance, Nagahama '382 discloses numerous different types of buffer layers which do not fall within the scope of the

present claims. However, the Examiner has only selected one, in particular that disclosed at column 19. Additionally, Shakuda '492, although disclosing a GaN-based single crystalline layer, fails to suggest or disclose the present GaN-based buffer layers as was explained to the Examiner in the previous Response (see pages 6-7 of the Response filed on December 7, 2006). Nonetheless the Examiner has selected these aspects while ignoring others in order to arrive at the present rejection. This is improper and thus cannot form the basis for a *prima facie* case of obviousness.

Further, in review of Nagahama '382, the Examiner has utilized the teachings of the first and second buffer layers of Nagahama '382 in order to construct the present buffer layer. For instance, Nagahama '382 discloses InGaN as a first buffer layer (11), (see column 19, line 10). Nagahama '382 also discloses GaN as a second buffer layer (112) deposited on top of the first buffer layer. The Examiner utilizes these combined teachings a first and second buffer layer of Nagahama '382 in order to meet the GaN-based buffer layer according to the present invention of InGaN/GaN. Applicant submits that these layers are not intended to read upon the "two-layered" structure, currently claimed. However, in an effort to further prosecution, Applicant has removed this limitation from claims 1 and 7. Therefore, there exists no obviousness based upon Nagahama '382. The Examiner is therefore requested to withdraw this rejection.

The Examiner has also rejected claims 2, 3, 10 and 11 under 35 U.S.C. § 103(a) as being obvious over Nagahama '382 in view of Shakuda '492 and Kano et al., US 2001/0035531 (hereinafter referred to as Kano '531). Applicant respectfully traverses this rejection.

Applicant has already distinguished Nagahama '382 above. The secondary references of Shakuda '492 and Kano '531 fail to cure these deficiencies. Therefore, this rejection is likewise overcome. Reconsideration and withdrawal thereof are respectfully requested.

Lastly, the Examiner has rejected claims 4-6 under 35 U.S.C. § 103(a) as being obvious over Doverspike et al., USP 6,459,100 (hereinafter referred to as Doverspike '100) in view of Nagahama '382. Applicant respectfully traverses this rejection.

Similar to claims 1 and 7, claim 4 has also been amended to remove reference to the two-layered GaN-based buffer layer. Further, Doverspike '100 fails to cure this deficiency in the teaching of Nagahama '382. Therefore, this rejection is overcome for the same reasons discussed above. Reconsideration and withdrawal thereof are respectfully requested.

#### Allowable Subject Matter

The Examiner has indicated that claims 8, 12 and 14 are allowable since they recite a GaN-based buffer layer grown by introducing sources of TMGa, TMIn and TMAI and a gas of NH<sub>3</sub> at the time while supplying carrier gases of H<sub>2</sub> and N<sub>2</sub>. These claims have been placed into independent format and are thus allowable.

Further, the other pending claims subject to rejection in the outstanding Office Action are also patentable for the reasons discussed above.

#### Newly Added Claims 16-18

Applicant notes that the combined thicknesses of the first and second buffer layers of Nagahama '382 is much greater than the intended thickness of the present GaN-based buffer layer. For instance, at column 19, lines 10-13 of Nagahama '382 it is explained that the first

buffer layer has a thickness of several tens to several hundreds of angstroms. Next, at column 19, lines 61-66 it is disclosed that the second buffer layer is preferably controlled to be 0.1 $\mu$ m or greater (1000 angstroms or more). However, as disclosed in the present invention and as recited in new claims 16-18, the thickness of the GaN-based buffer layer is 50-800 angstroms. None of the cited references can cure this deficiency of Nagahama '386. Accordingly, newly added claims 16-18 are patentable and should be allowed.

In view of the above, the Examiner is requested to withdraw all rejections and allow the currently pending claims.

If the Examiner has any questions or comments, please contact the undersigned at the offices of Birch, Stewart, Kolasch & Birch, LLP.


If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to our Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. § 1.16 or under § 1.17; particularly, extension of time fees.

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Respectfully submitted,



By

 #42874

James T. Eller, Jr.

Registration No.: 39,538

BIRCH, STEWART, KOLASCH & BIRCH, LLP

8110 Gatehouse Road

Suite 100 East

P.O. Box 747

Falls Church, Virginia 22040-0747

(703) 205-8000

Attorney for Applicant